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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/425,694 10/22/99 BRUNNER

R BRUNNER-ET-A

EXAMINER

IM52/1022

COLLARD & ROE PC
1077 NORTHERN BLVD
ROSLYN NY 11576

BROWN, C
ART UNIT

PAPER NUMBER

1765
DATE MAILED:

10/22/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/425,694

Applicant(s)
Brunner et al.

Examiner
Charlotte A. Brown

Art Unit
1765



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Aug 6, 2001
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☒ All b) ☐ Some* c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

Art Unit: 1765

DETAILED ACTION

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In line 7 of claim 1, "O₃ only containing O₃" is new matter.

In line 9 of claim 1, "HCl only containing HCl", is new matter.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Pirooz (EP 0701275).

From line 32 of column 2 to the end of column 3, Pirooz discloses a method for treating a silicon wafer which includes the step of contacting the surface of the silicon wafer with an

Art Unit: 1765

aqueous solution containing hydrofluoric acid to remove the metals from the wafer surface. The removal is carried out by contacting the silicon wafers with an aqueous solution containing about 1:1 to 1:10,000 parts by volume HF:H₂O. To enhance the metals removal, the solution may additionally contain HCl, H₂O₂ OR O₃. (Column 2, lines 49-54). This reads on the applicant's limitation of firstly treating the semiconductor wafers in a bath with an aqueous HF solution and optionally containing HCl and optionally a surfactant. Next, the wafers are contacted with high purity ozonated water containing ozone (Column 3, lines 14-15). This reads on the applicant's limitation of treating the wafers in a bath with an aqueous O₃ solution only containing O₃. The aqueous ozone solution may additionally contain hydrochloric acid (HCl) or nitric acid. (Column 3, lines 32-34). The final step of the cleaning process is drying the oxidized wafers. The wafers may be dried using any method which does not recontaminate the wafers with metals or other contaminants. Such methods include conventional spin drying and isopropyl alcohol vapor drying techniques which are well known in the field.

Unlike the claimed process, Pirooz rinses the wafers with deionized water, but he does it after the removal of the metals and therefore it is inherent that the that steps would avoid the addition of fresh water or other liquids to the treatment baths since the rinsing step is performed after the completion of the treatment steps.

Unlike the claimed invention, Pirooz does not disclose a method for forming the treatment sequence B₂ by treating the semiconductor wafer with an aqueous O₃ solution and then treating the semiconductor wafers in a bath with an aqueous HCl solution only containing HCl. Since

Art Unit: 1765

Pirooz first treats the semiconductor wafer with an ozone in water and then optionally adds hydrochloric acid, it is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Pirooz's procedure by treating the semiconductor wafers with O_3 , and then treating the wafers with a liquid containing HCl in a separate bath in order to produce a more efficient procedure for removing the metals from the surface of the semiconductor wafers thereby enhancing the metals removal.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. (EP 0731498A2)

Fukuzawa discloses a silicon substrate surface processing method comprising the steps of supplying an HF water solution and ozone water into a processing bath to create a mixture containing HF with a concentration of 0.01% to 1% and ozone water with a concentration of 0.1 ppm to 20 ppm.

6. Applicant's arguments filed August 6, 2001 have been fully considered but they are not persuasive.

In traversing the rejection based on Pirooz, the applicants' state that Pirooz does not teach firstly treating the semiconductor wafer in an HF solution and then adding O_3 , H_2O_2 , or HCl in water. This point is not accepted since Pirooz teaches that the metals removal is carried out by contacting the silicon wafers with an aqueous solution containing hydrofluoric acid and water. To

Art Unit: 1765

enhance the metals removal, the solution may additionally contain HCl or ozone (Column 2, lines 48-56). The wafers are then contacted with ozone. The ozone solution may additionally contain HCl (Column 13-14). The applicants' specification does not support using an 'O₃ solution only containing O₃' and an 'HCl solution only containing HCl'. On page 3 of the specification, the applicants' have disclosed that the O₃ solution may optionally contain HF and the HCL solution may optionally contain O₃. Therefore, the solutions may contain other substances.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

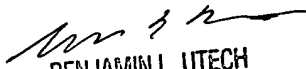
Art Unit: 1765

8. Any inquiry concerning this communication from the Examiner should be directed to Charlotte A. Brown whose telephone number is (703) 305-0727. The Examiner can normally be reached during the hours of 9:00AM to 6:30PM.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-5408 for regular communications and 703-305-3599 for After final communications.

CAB

October 17, 2001


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